Model W
Wall Mounted
Static Transfer Switch

63 Amperes
3-phase, 4 Pole

User Manual
2014

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CAUTIONS and WARNINGS

CAUTION
REMOVAL OF PANELS EXPOSES DANGEROUS VOLTAGES
ACCESS RESTRICTED TO QUALIFIED PERSONNEL ONLY

The **maintenance bypass switch** should be used when the user is sure that the supplies are both available of the same magnitude and phase.

If the STS is on Supply 1 then the maintenance bypass switch should only be operated to position 1. Similarly if the is on Supply 2 then the maintenance bypass switch should only be operated to position 2.

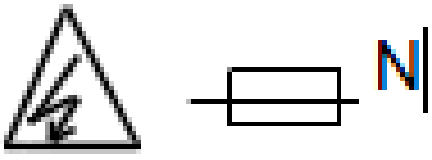
In the case of a control failure the STS internal control logic can be overridden and the output can be forced to the correct state using the OVERRIDE switch to position 1 or 2 as appropriate. Remember that the switch needs to be in the centre "O" position for normal operation.

The override provides control logic bypass only' it does not provide an alternative path for the load power.

Do not use the OVERRIDE switch to affect a transfer. It is for maintenance only.
NEVER attempt to operate the OVERRIDE switch if the supplies are not in synchronism. There is no interlock to prevent the switch from being operated when the supplies are not available or not in synchronism. Refer to the LCD variables display and mimic diagram for the not in synchronism state, (SYNC indicator on the LCD mimic will be RED, variables display will show degrees out of synchronism. Only operate when less than 10 degrees). If the control is not operating you may need to use other means to determine that the supplies are in synchronism. Do not operate the OVERRIDE switch onto an absent supply.

CAUTION
THIS EQUIPMENT RECEIVES POWER FROM MORE THAN ONE SOURCE. DISCONNECT OUTPUT AND ALL INPUT SOURCES OF POWER FROM THIS EQUIPMENT BEFORE SERVICING.

WARNING
HIGH LEAKAGE CURRENTS ON ISOLATED INCOMING AND OUTGOING CIRCUITS. EARTH CONNECTION IS ESSENTIAL BEFORE WORKING ON CIRCUITS OR CONNECTING / DISCONNECTING SUPPLIES. SEE INSTALLATION INSTRUCTIONS BEFORE CONNECTING / DISCONNECTING INPUT SUPPLIES.



CAUTION
DOUBLE POLE/NEUTRAL FUSING

1. System Description

1.1 Static Transfer Switch (STS)

The Static Transfer Switch (STS) provides power and redundancy to items requiring / having only a single AC supply source. The STS selects this supply from one of two input AC supplies. If one of the supply sources becomes unavailable the STS will automatically transfer the critical load to the alternative AC supply source.

Manual selection of supply is also possible.

This Static Transfer Switch has 4 identical and symmetrical switches, one for each phase of the 3-phase AC to provide the output.

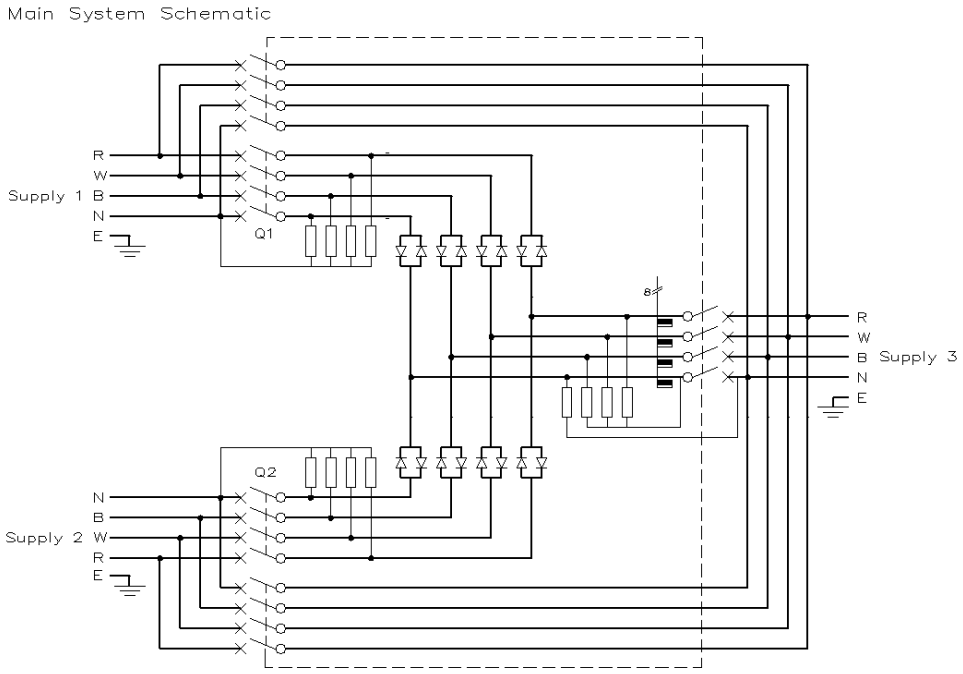


fig. 1.

This STS implementation uses Break-Before-Make transfer characteristics to ensure that the two sources are never paralleled so that the failure of one supply source has no impact on the other. The supplies can be truly independent. A bump less transfer is only possible if the supplies are in synchronism.

The installed STS is a 4 Pole switch where the neutral is also switched (overlapping).

Upon incoming supply failure or degradation of the selected supply the STS immediately transfers the critical load to the alternative stand-by source.

The break time is usually less than one millisecond, however under worst case conditions, can be up to 5 milli-seconds when there is a loss of supply.

1. System Description

No manual transfers are possible if the supplies are too far out of synchronism, however, an automatic transfer to the alternate source will be undertaken if the present source fails or degrades beyond being useful. A break is inserted purposely if the supplies are out of synchronism and a transfer is necessary.

In the case of downstream load fault conditions, the fault current drawn from the supply may degrade or damage the supply sources; as a consequence should a fault current exist in the load the STS will inhibit a transfer to the alternate source even if this causes source supply degradation or loss. At least the fault will not be transferred to the alternate supply with the possibility of degrading both sources. The current threshold for isolation is pre-set and is dependent on factors such as the capacity of the supply sources, line impedance and the line protection schemes employed for each STS.

It should be noted that the fuses are for the protection of the semiconductor switches (SCRs/ Thyristors), not the load. The STS does not have any automatic tripping devices, so, load discrimination is undertaken in the primary and secondary supply networks and shouldn’t rely on the internal fuses.

The STS is completely self-contained with its own detection, logic, display and controls.

2. System Display Panel

2.1 Overview.

A Colour, back-lit, touch screen LCD provides the user with an easy to navigate hierarchical real time information and control interface.

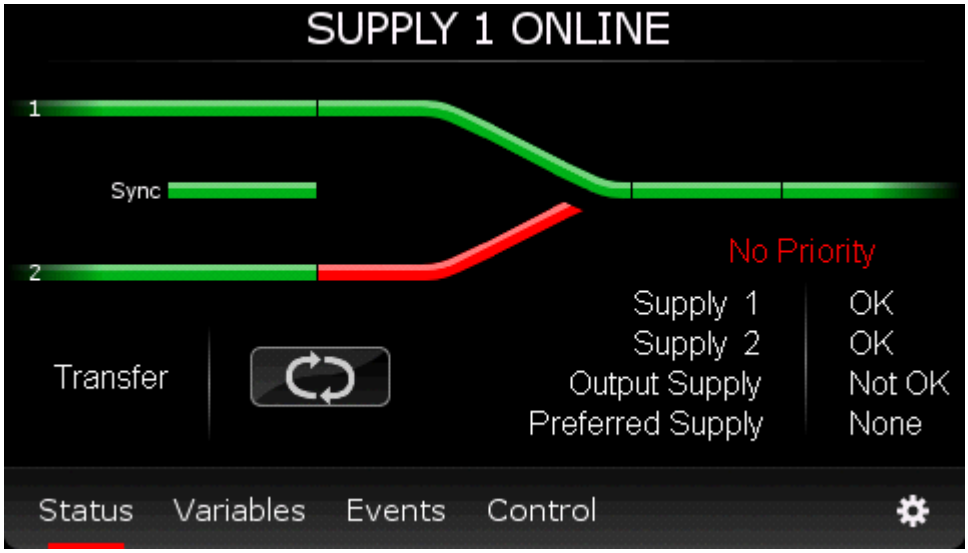


fig. 2. The system display panel.

The LCD provides a full-colour mimic, alarm / status indication and audible alarm to provide instant recognition of the STS state.

Easily identify state changes from the mimic diagram showing system status and / or alarms (Default screen)

Use the touch screen zones along the bottom of the screen to navigate the various information and control options.

The LCD menus are structured in a hierarchy through which the operator navigates by use of the LCD control pushbuttons.

All states are bi-colour where GREEN indicates the normal or on state.

The TRANSFER control function forms part of the LCD control panel and is accessed using the transfer touch zone pushbutton. **Press and hold for 3 seconds** to affect a transfer. This transfer control pushbutton zone can be removed if desired (to make the install more secure) via the CONTROL menu and selecting the “TRANSFER”, “OFF” condition / option.

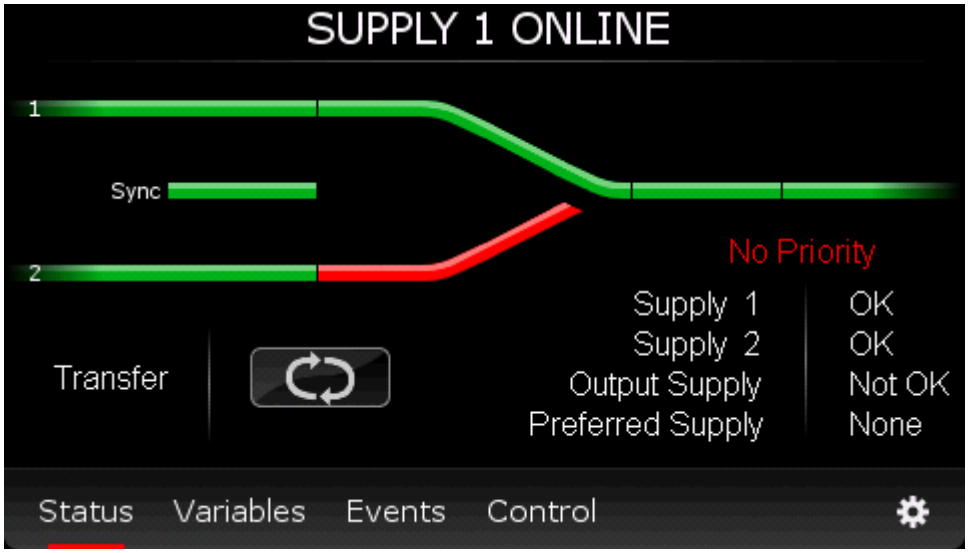
The unit can also be transferred using the priority switch behind the front panel cover.

2. System Display Panel

2.1 Mimic / Status Screen

This menu item provides details on the equipment operating status and event history.
STS Status

Status summary of the Static Transfer Switch. Provides information on any active alarm or fault conditions.



The availability of supply 1 and 2 is indicated by the respective supply LCD diagram (Green being the ON or OK state).

The synchronization hold-off bar between the two sources on the LCD mimic is located between the two supply bars. Green is in synchronism.

1 and 2 indicate which source is supplying the critical load.

An alarm indication provides indication of an unacceptable, alarm or fault condition. Information as to the cause of the alarm condition is available from the LCD event history or the status indicators located on the LCD. The alarm indication and audible alarm (if available) can be cancelled by pressing the Alarms screen.

.

2. System Display Panel

2.2 Alarm Indication

Alternating visual display of ALARM Condition

When indicated the user touches the LCD screen to acknowledge the condition, silence the audible alarm and show the default Status display.

The LCD further provides useful real-time information such as supply variables, power quality, event log via a 200 deep, real time, easily understandable event log to provide the user with operational information displays.

The audible alarm is shipped disabled, however, may be re-enabled using the CONTROL menu option "**Sound** "ON". Similarly it is able to be disabled if required.

2. System Display Panel

2.3 Variables Display

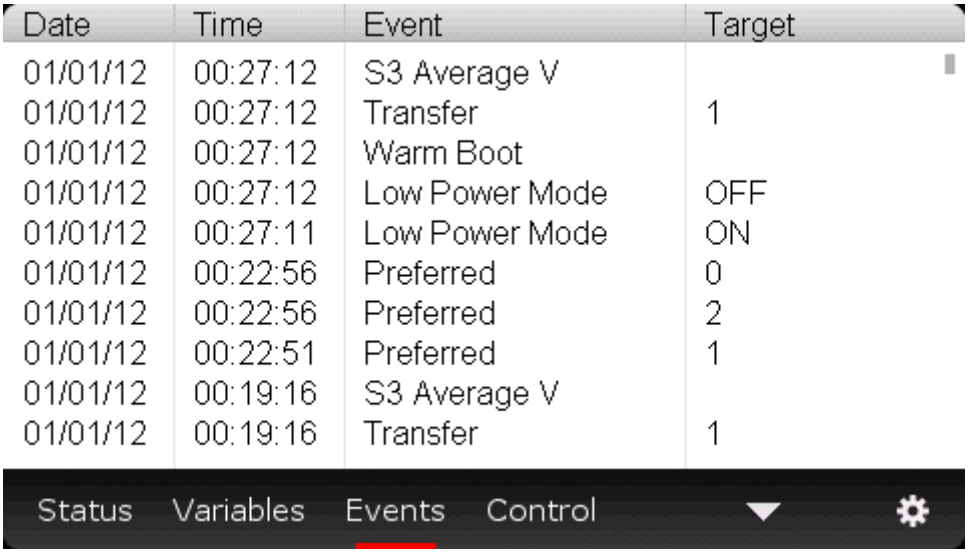
This menu item shows the input & output variables.

- Output Voltage R, W & B phase.
- Output Current R, W, & B phase.
- Output Power Factor.
- Output Power (kWatts).
- Output Power (kVA)
- Frequency for each source
- 1 Source Input Voltage R phase.
- 1 Source Input Voltage W phase.
- 1 Source Input Voltage B phase.
- 2 Source Input Voltage R phase.
- 2 Source Input Voltage W phase.
- 2 Source Input Voltage B phase.
- Phase Angle between Sources 1 & 2

It should be noted that if the variables are not displayed and the internal isolators are closed and external power is applied it is likely that the internal fuses are blown. We do not advise that the user replace the internal fuses. In case of fuse failure other components too could have sustained damage and any remedial action should be undertaken by a certified repair agent or the unit returned to the manufacturer for repair and re-test.

2. System Display Panel

2.4 Event History


Date Time Event Target
01/01/12 00:27:12 S3 Average V
01/01/12 00:27:12 Transfer 1
01/01/12 00:27:12 Warm Boot
01/01/12 00:27:12 Low Power Mode OFF
01/01/12 00:27:11 Low Power Mode ON
01/01/12 00:22:56 Preferred 0
01/01/12 00:22:56 Preferred 2
01/01/12 00:22:51 Preferred 1
01/01/12 00:19:16 S3 Average V
01/01/12 00:19:16 Transfer 1
Status Variables Events Control

Access to the Event / Alarms list is available via the “Events” screen selection. To scroll through the events buffer the user presses the “Events” pushbutton again. Up to 200 events can be scrolled.

Once the buffer is full the oldest events fall from the buffer and are replaced by any new events.

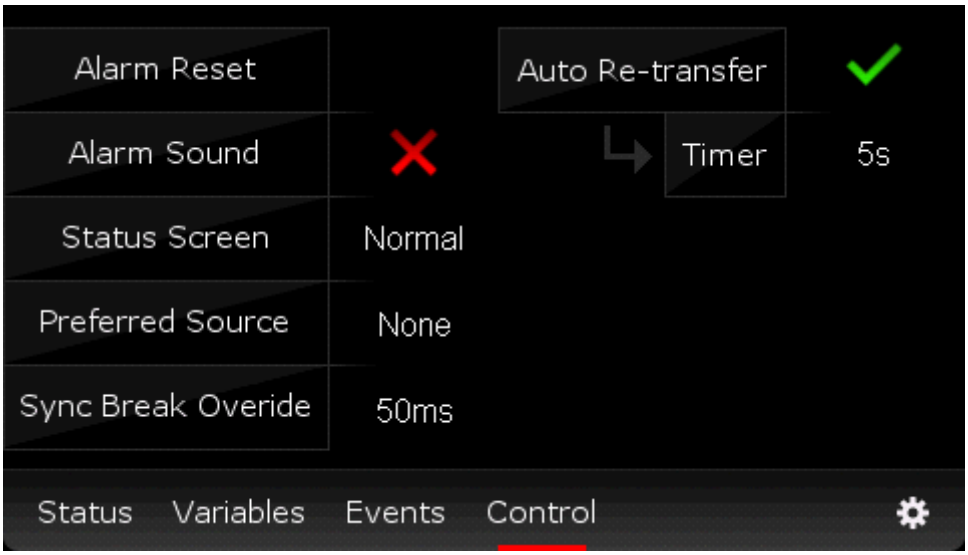
2. System Display Panel

2.5 Controls

The control interface provides access to all essential parameters and set-up information.

The TRANSFER control function forms part of the LCD control panel and is accessed using the Control touch zone screen pushbutton.

Once pressed the user / operator merely pushes the transfer pushbutton to effect a transfer to the alternate supply.



Control Functions

LCD control functions enable the user to:

- STATUS SCREEN, Enable / Disable the front panel TRANSFER pushbutton
- ALARM SOUND – Set the audible On/Off
- PREFERRED SOURCE, priority 1, 2 or None
- SYNCH BREAK OVERRIDE The break time (50 msec)
- TIMER The time before auto-re-transfer occurs
- AUTO RE-TRANSFER (Enable / Disable)
- ALARM RESET (cancels if alarm has cleared), press & hold 6 sec if transfer is inhibited

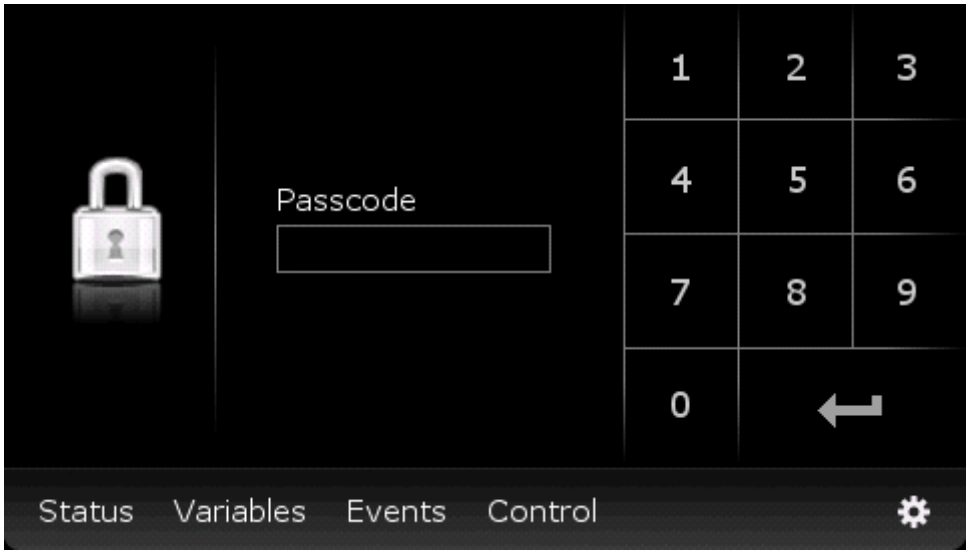
Synch Break & Mode Angle Detection Setting

Provides access to adjust the allowable not in synchronism transfer. (Default is 9^{o} and is adjustable between 5^{o} – 30^{o}), Manual transfers are inhibited when supplies are outside this range, however, automatic transfers will experience a 50 msec break, settable (0 – 150 msec).

2. System Display Panel

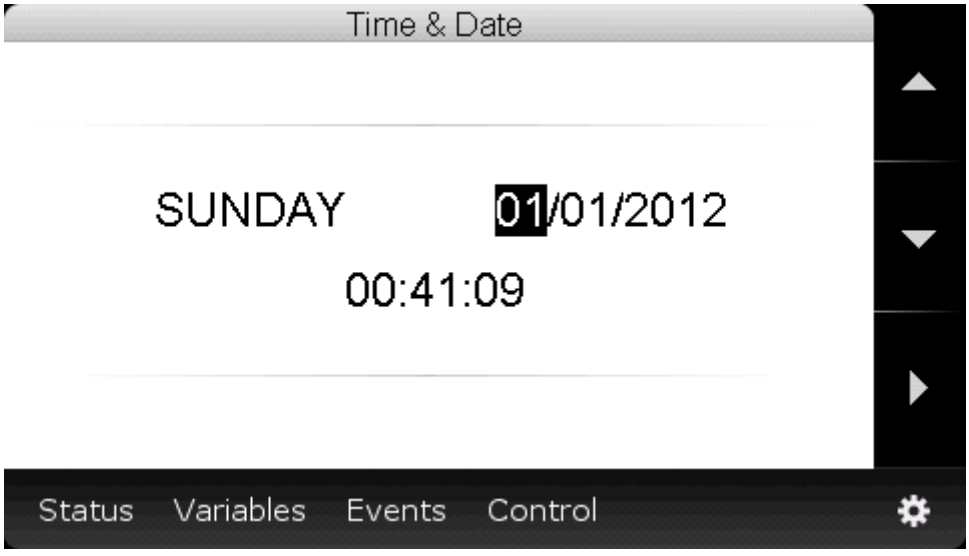
2.6 Settings Menu

This menu item provides a facility for adjusting STS settings and calibrations.



2.6.1 Password
Restricted access to set-up menus (2 levels of access 000 and 1234).

2.6.2 Date / Time
Date and Time adjustment.
This menu item displays general information about the equipment.



Use the scroll key → to access the parameter then the up & down keys to set the desired parameter value.

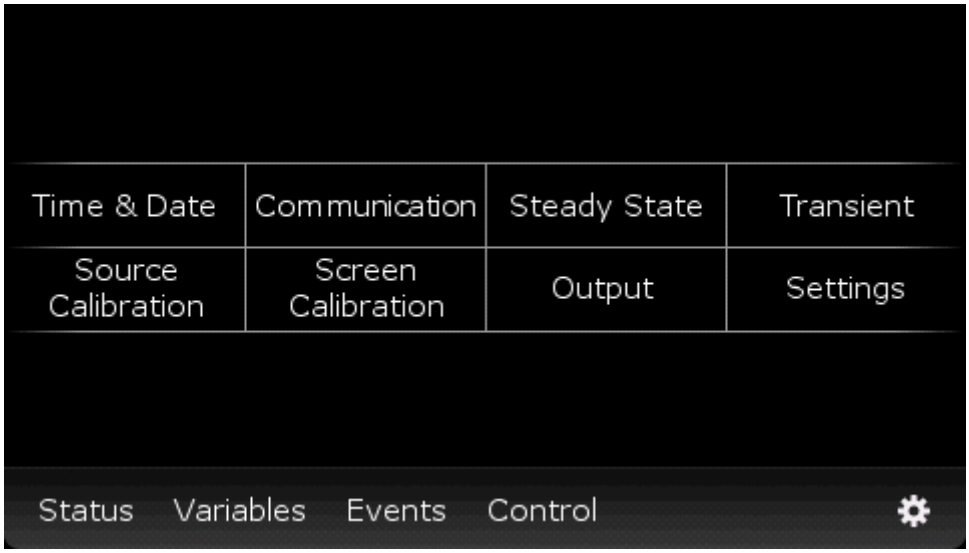
2. System Display Panel

2.7 Settings (1234 protected)

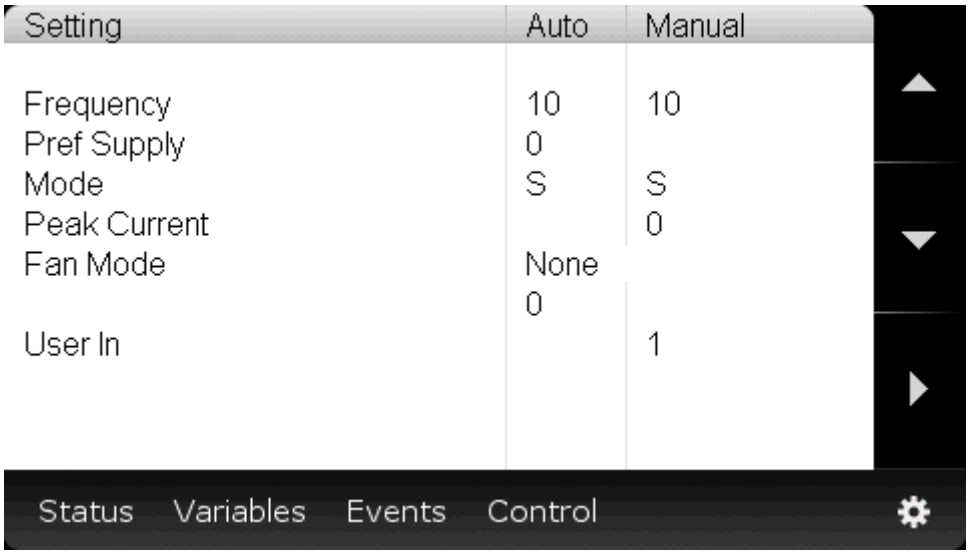
DANGER, the STS has been shipped with factory defaults. These are the most reliable settings for correct stable operation. The settings should not be changed unless the user has a full understanding of the consequences. Incorrect settings could cause the system to become unstable.

Consult Static Power prior to changing any settings.

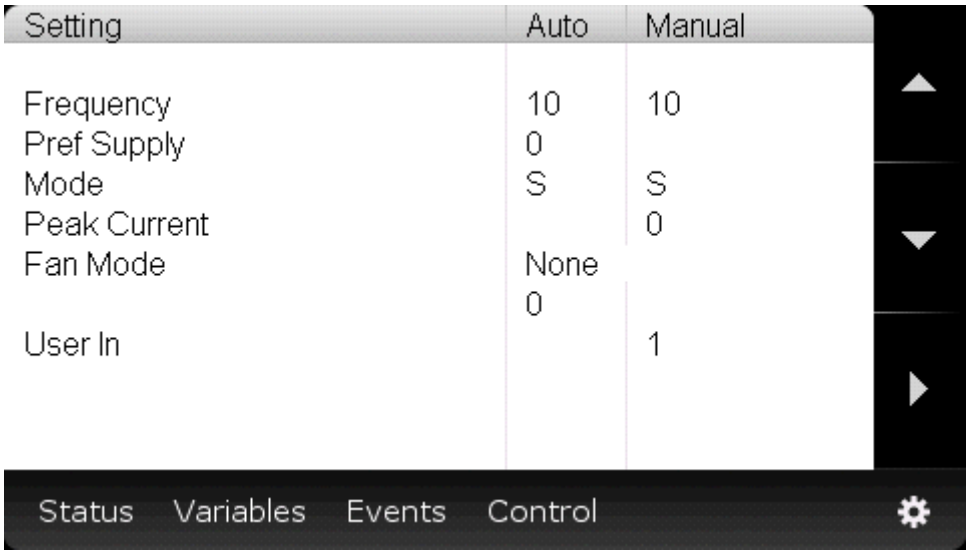
STS settings must always be wider than the source that is supplying the STS, otherwise the STS will become unstable and the load could be compromised.

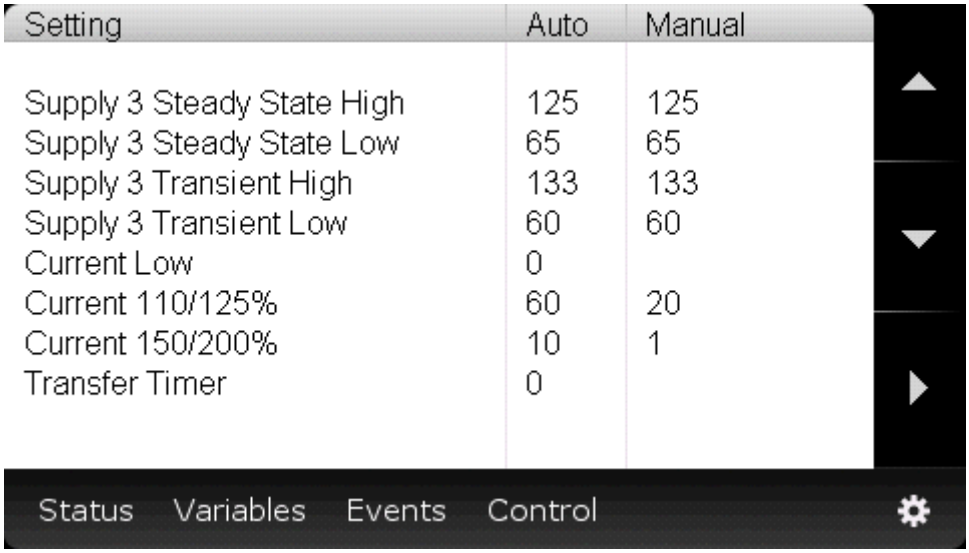


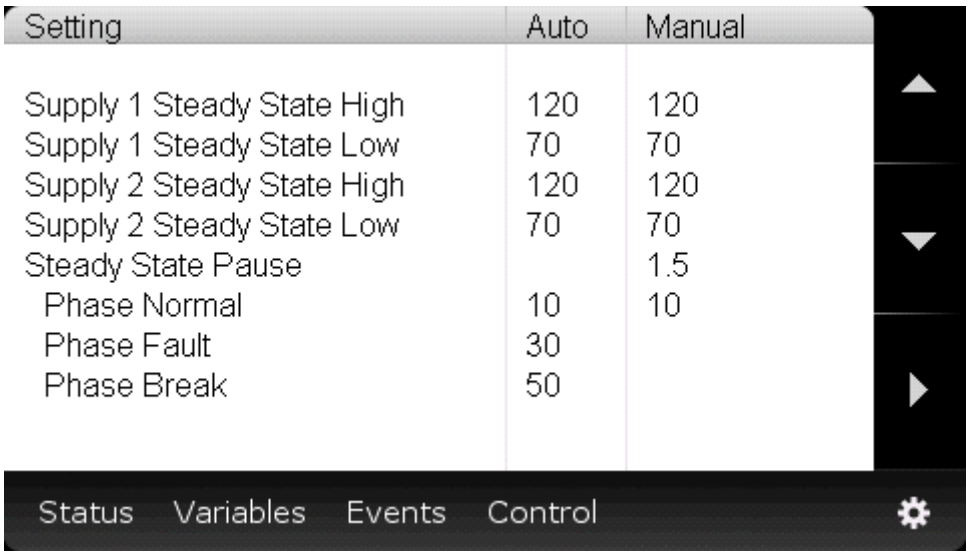
The following screens show the available options. The Auto set of settings apply to normal STS operation (unattended). The Manual setting are referenced when the STS is manually operated (Manual user transfer requests).



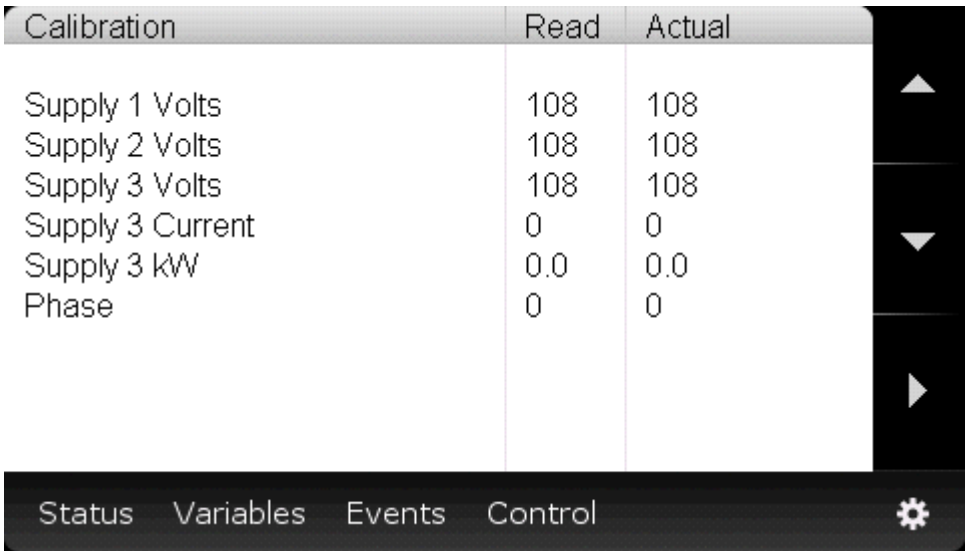
2. System Display Panel







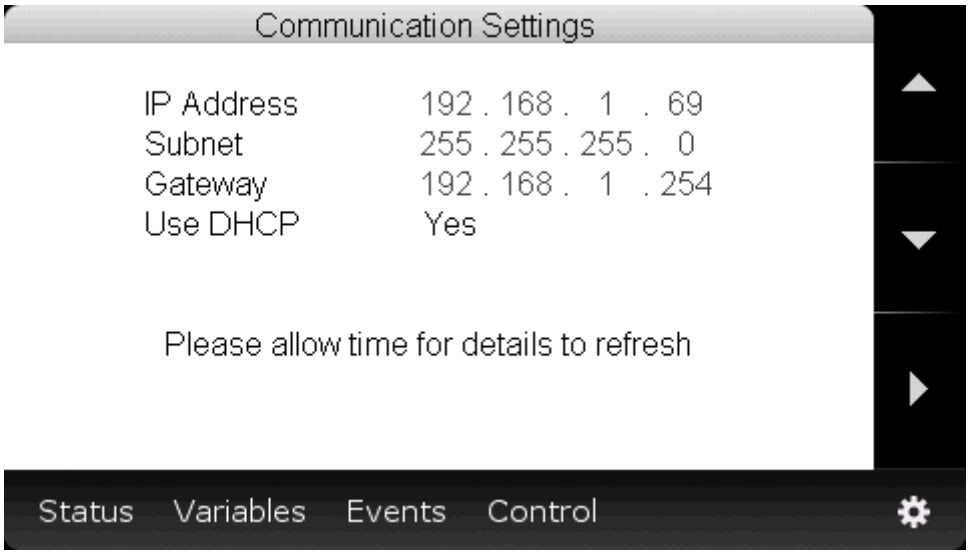
2. System Display Panel



This screen is used to adjust display accuracy of display variables (only or +/- 2 – 3 volts, follow the prompts, read the accurate value and enter into the Actual column.

2.7.1 Communication Settings

LAN Web Server and SNMP TCP / network address configuration.


Communication Settings
IP Address 192 . 168 . 1 . 69
Subnet 255 . 255 . 255 . 0
Gateway 192 . 168 . 1 . 254
Use DHCP Yes
Please allow time for details to refresh
Status
Variables
Events
Control

The “Use defaults:” refers to the default pre-set IP address, DHCP is the default (where the address is taken from the network)

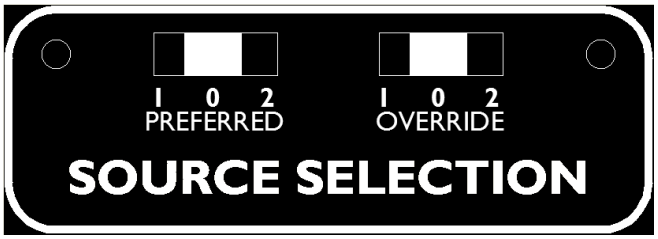
A separate document describes the SNMP and Modbus functionality

2. System Display Panel

At reset / start-up whilst the unit is undertaking its initialization / self test the following screen is displayed.

3. STS Operation

3.1 - Source Selection



Source selection at the front of the STS.

3.1.1 - Preferred Source Selection

Preferred source selection is pre-set by a mechanical slide switch at the front of the unit or via menu selection (2.5 - Control screen & 2.6.6 - Settings 4). Note that at power-up the STS will activate the preferred source as pre-set by the slide switch.

The preferred source selection does not operate if the STS is manually transferred to the alternative supply from the touch zone. The preferred source selection switch on the panel at the rear of the STS will override any preferred source settings that are made using the LCD controls.

Preferred source selection overview

0	No preferred source
1	Supply 1 is the preferred source. If STS is forced to automatically transfer the critical load to the alternate (Supply 2) source, the STS will automatically transfer back to Supply 1 when it returns to tolerance and after a pre-set settling delay.
2	Supply 2 is the preferred source. If STS is forced to automatically transfer the critical load to the alternate (Supply 1) source, the STS will automatically transfer back to Supply 2 when it returns to tolerance and after a pre-set settling delay.

3.1.2 - Override Source Selection

The purpose of the override switch is to override the control electronics and lock the STS to the source that is presently selected. It used for maintenance purposes. The override selection must not be used to transfer the critical load from one source to the other. Use the preferred source selector to transfer the load if the LCD panel is unavailable. Never operate the Override switch if the supplies are not in synchronism or not available. Do not use the Override as a transfer mechanism (Use the Preferred switch or the front LCD otherwise loss of power may result.

Override source selection overview

0	Normal – No control override
1	Control Override -> Supply 1 is forced to supply the critical load, directly overriding any internal control logic.
2	Control Override -> Supply 2 is forced to supply the critical load, directly overriding any internal control logic.

3. STS Operation

3.2 - Maintenance Bypass Switch

This switch situated at the rear right of the unit allows for a maintenance bypass arrangement. The switch is normally in the “N” position and can be used to bypass the internals of the STS to either “Supply Source 1” (turn CCW) or “Supply Source 2” (turn CW).

It should be noted however, that operation should only be affected in the direction of the presently operating source. It cannot be used to transfer the critical load from one source to the other.

A padlock can be used to stop inadvertent / unauthorized operation.

- Anti-clockwise to position 1 (Source 1)
- Clockwise to position 2 (Source 2)

The switch position indicates the maintenance bypass state.

3.2.1 - To Maintenance Bypass Procedure

1. Ensure that the preferred source selection switch at the rear of the unit is positioned towards the source that will be supplying the load during bypass (either 1 or 2).

2. If the STS is not supplying the load through the selected source, wait for the STS to transfer to the selected source.

3. Rotate the Maintenance Bypass Switch to the desired position. The switch will rotate 90 degrees in either direction from the vertical.

4. The STS is now in Maintenance Bypass and is supplying, but no longer protecting, the critical load.

3.2.2 - From Maintenance Bypass Procedure

1. Ensure that the preferred source selection switch at the rear of the unit is positioned towards the source that was supplying the load during bypass (either 1 or 2).

2. If the STS is not supplying the load through the selected source, wait for the STS to transfer to the selected source.

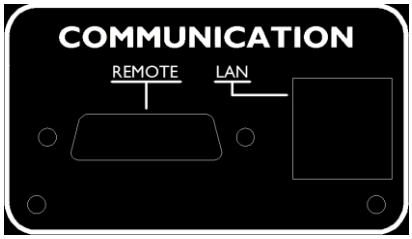
3. Confirm, via the mimic diagram, that the STS is ‘online’ (the single line at the right hand side of the diagram should be green.)

4. Rotate the Maintenance Bypass Switch to the ‘N’ position.

5. The STS is now in Normal mode and is protecting the critical load.

3. STS Operation

3.4 - Communications interface



Communications interface at the front of the STS.

The communications interface provides remote voltage free contacts for BMS or remote alarm indication and optional control of the STS from remote. The LAN enables remote viewing of the state of the STS using an internet browser or via SNMP or via Modbus TCP

3.4.1 – LAN Interface

Connecting to the LAN interface can be done two different ways with a RJ45 Cat5 Ethernet cable:

- To a Network hub/switch using a straight-through cable.
- To a PC using a cross-over cable. (Most PCs can now work with a straight-though cable)

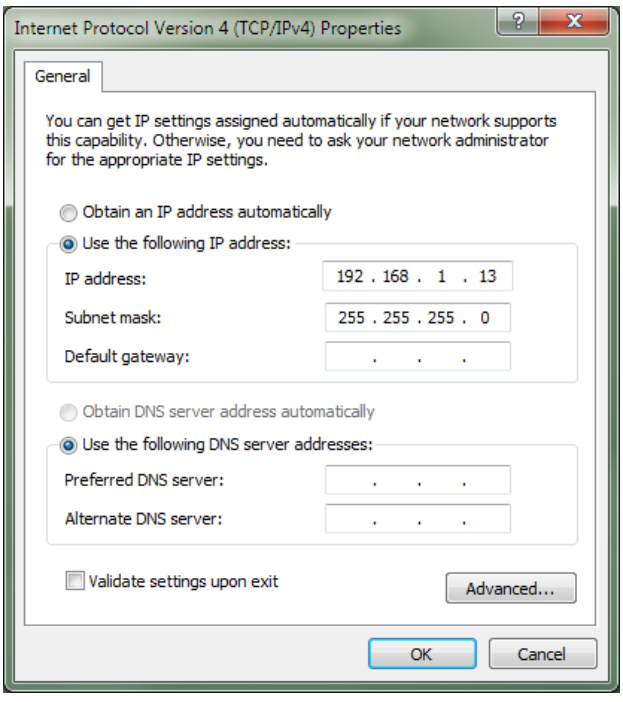
Connection to a Network

By default the STS uses DHCP to get assigned its IP information automatically. If your network does not have a DHCP server or you wish to use a static IP this can be changed in the communications settings screen described above.

Connection to a PC

Both the STS and PC must have statically assigned IP addresses on the same subnet. Set the STS's IP in the communications screen described above. By default this is IP: 192.168.1.2 with Mask: 255.255.255.0
To set your PC's IP address in Windows 7 navigate to: 'Network and Sharing Center' → 'Change adapter settings', right-click the network interface → 'Properties'. Select 'TCP/IPv4' → 'Properties'.

TCP/IPv4 Properties

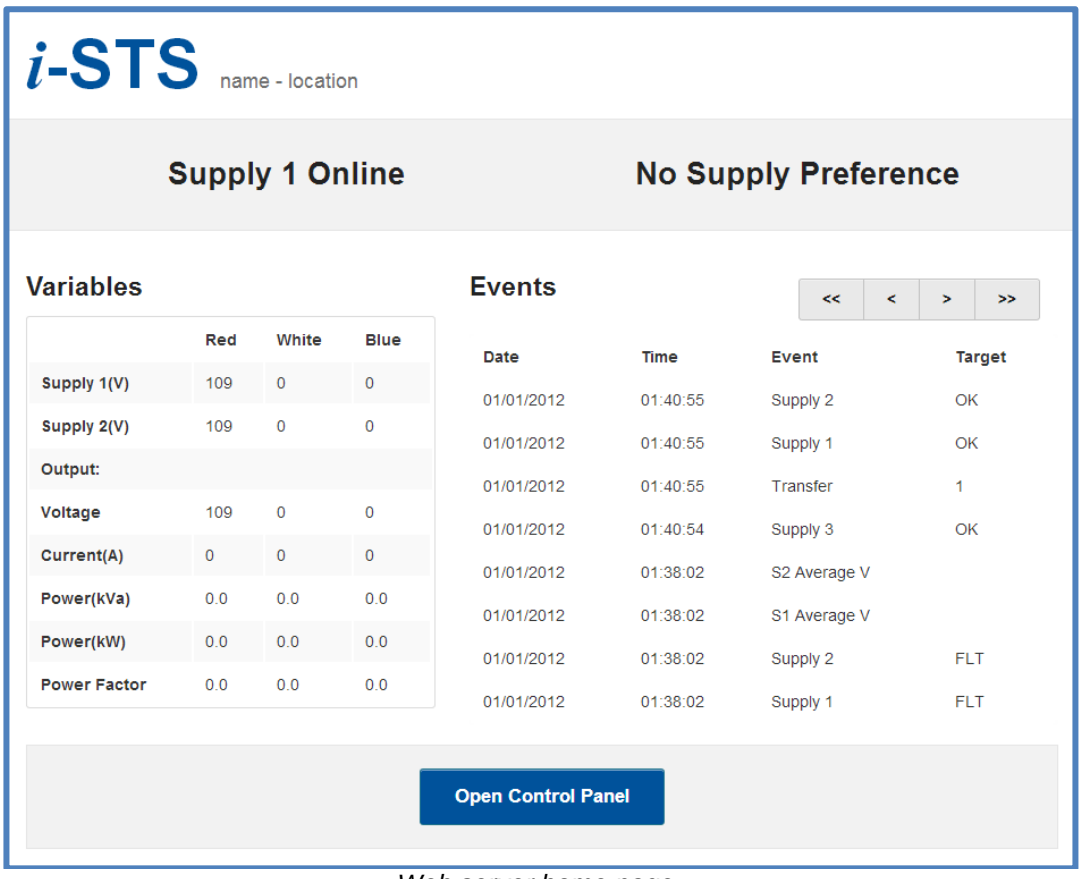

Internet Protocol Version 4 (TCP/IPv4) Properties
General
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.
Obtain an IP address automatically
Use the following IP address:
IP address:
192 . 168 . 1 . 13
Subnet mask:
255 . 255 . 255 . 0
Default gateway:
Obtain DNS server address automatically
Use the following DNS server addresses:
Preferred DNS server:
Alternate DNS server:
Validate settings upon exit
Advanced...
OK
Cancel

3. STS Operation

Connection to the Web Server

Ping the STS to confirm connection and then enter the address into a web browser. If the DHCP / address have not been registered on your network then you may need to momentarily (a few seconds) remove and re-instate the network cable to re-register on your network.

The home page shows which supply the unit is on, supply preference, variables, and events.



Web server home page.

For safety, authentication is required to enter the control panel:
User Name: **admin**
Password: **1234**

From here you can:

- View utilisation.
- Transfer supplies.
- Set preferred supply.
- Change unit name and location.
- Set the IP address.
- Adjust time and date.
- Adjust settings for:
    - Input steady state.
    - Input transient.
    - Output.

3. STS Operation

3.4.2 – DB15 Connector

The voltage free contacts are available through the DB15 connector. These are pre-set and cannot be changed by the user.

CAUTION

The power cabling <u>should not</u> be run adjacent to user controls. Separate these control cables from power circuits by at least 300 mm. The control signals are distance limited to 30 metres.

All output relays contacts are rated for 50 V DC 1 Ampere (Not 230 V AC rated)

On DB15 Connector
User Remote Inputs (Voltage free contact closure controllers only)
Pin 11 to Pin 7 Remote Transfer to S1
Pin 13 to Pin 7 Remote Transfer to S2

User Relay Outputs
Relays are normally closed and held open in OK state (closed contact represents the alarm state).
Pin 1 to 3 - STS on Supply 1
Pin 5 to 14 - STS on Supply 2
Pin 2 to 4 - STS overloaded
Pin 6 to 8 - Supplies not in sync
Pin 10 to 12 - General alarm

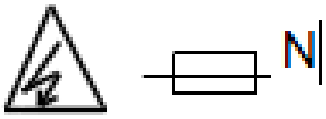
For further information please consult the manufacturer
e.g. Modbus TCP (RTU only) definitions file
LAN Screens
SNMP MIB definitions file

4. Maintenance Bypass

4.1 Installation and Commissioning

Read this whole document thoroughly. Understand every aspect before proceeding. Request further assistance if you do not understand any aspect of the operation of the STS. Support and contact numbers are at the rear of the manual.

Consider electrical distribution discrimination carefully. The STS has two incoming AC power isolators your upstream protective devices must discriminate with downstream protective devices and limit the peak fault current to less than 20kA so that when a fault occurs other items connected to the STS are not powered off by the opening of upstream protective devices. The upstream, STS supply breaker /fuse should only open if the downstream device protection is unable to trip or there is a fault within the STS.



CAUTION
DOUBLE POLE/NEUTRAL FUSING

CAUTION
REMOVAL OF PANELS EXPOSES DANGEROUS VOLTAGES
ACCESS RESTRICTED TO QUALIFIED PERSONNEL ONLY

In case of downstream fault the STS will not transfer the fault to the alternate supply even if the voltage is adversely affected. Once the fault current has cleared the STS will resume normal operation protecting the critical loads from voltage disturbances, (10 second settling time).

After following all of the considerations and precautionary processes in the last section and been successful and understanding, then no further special set-up is necessary. Each unit has been fully certified and heat soaked prior to shipment.

The ALARM should not be active.

If it is check the following states.

- ON Supply 1 when priority is Supply 2
- On Supply 2 when priority is Supply 1
- Supply 1 or Supply 2 are not in spec.
- Override Switch is in position 1 or 2
- Supply 1 & 2 are not in synchronism
- The unit is too hot (thermal bi-metal switch on H.S. activated)
- There is / was an over-current/ overload / load fault condition

4. Maintenance Bypass

Ensure from the supply that you are connected to on the STS is also the supply selected by the Maintenance Bypass Switch supply. If you have a remote maintenance bypass then it too should be in the normal position, prior to this step.

Go to normal mode (Use switching procedure 3.1.2 to go on line

Try using the TRANSFER push button to transfer to the alternate supply. To affect a transfer you need to push and hold the transfer pushbutton for at least 2 seconds.

The LCD should show that it is now powering the load from the other supply, (non preferred).

If unsuccessful or the LCD is not functioning a transfer can be affected using the priority / PREFERRED switch. Simply slide the switch to the desired supply, wait 5 seconds and check the LCD and display to confirm. If the STS does not transfer correctly consult the “Event List” for cause and speak to our service staff.

It should be noted that if the variables are not displayed and the internal isolators are closed and external power is applied it is likely that the internal fuses are blown. We do not advise that the user replace the internal fuses. In case of fuse failure other components too could have sustained damage and any remedial action should be undertaken by a certified repair agent or the unit returned to the manufacturer for repair and re-test.

It should be noted that fuse failures and damages and returns as a result of incorrect upstream or downstream protection are not covered by warranty.

This STS implementation uses Break-Before-Make transfer characteristics to ensure that the two sources are never paralleled so that the failure of one supply source has no impact on the other. The supplies can be truly independent. A bump less transfer is only possible if the supplies are in synchronism.

The installed STS is a 4 Pole switch where the neutral is also switched (overlapping).

Upon incoming supply failure or degradation of the selected supply the STS immediately transfers the critical load to the alternative stand-by source.

The break time is usually less than one millisecond, however under worst case conditions, can be up to 5 milli-seconds when there is a loss of supply.

No manual transfers are possible if the supplies are too far out of synchronism, however, an automatic transfer to the alternate source will be undertaken if the present source fails or degrades beyond being useful. A break is inserted purposely if the supplies are out of synchronism and a transfer is necessary.

5. Fault Diagnosis

5.1 Interpretation of LCD event list

Event Descriptor	Append	Description	STS Action Resulting
INITIALIZE		RAM CHKsum failed – Cold Start (RAM Corrupt) – Flash Defaults downloaded	None - Contact Chloride
WARM BOOT		Power-up, Warm Start, re-initialize all but RAM – Keeps Event List	Normal After Black Start
WATCHDOG TIMER	Diagnostic	Signals software / hardware problems	None - Contact Chloride
STACK	Diagnostic	Stack or Heap has overflowed	None - Contact Chloride
EEPROM		FLASH/ EEPROM Checksum error – cal may be damaged	None - Contact Chloride*
ROM		FLASH ROM has been corrupted (Program is in error)	None - Contact Chloride*
BATTERY		Battery has low power (needs replacing)	None - Contact Chloride*
COMMS	1/2/3/4/5/6/ 7/8	Communications has failed to Dig Proc, Ana1, Ana2, N1, N2	None - Contact Chloride (can self repair)
CALIBRATION	1/2/3	Calibration of MSP required	Contact Chloride *
LOW POWER MODE	ON/ OFF	LOW POWER MODE (Power Down Modes @ loss of electronics power)	LOW POWER MODES
S 1 / S2 / S3	AVERAGE V (R,W,B	Supply 1 or 2 OR 3 has Steady State High or Low or phase R, W or B	Transfers to supply 2 if on 1
S 1 / S2 / S3	TRANS V (Red, White, Blu)	Supply 1 or 2 OR 3 has Transient High or Low (1 sec)	Transfers to supply 2 if on 1
S 1 / S2 /S3	LOW /OK	Supply 1 or 2 OR 3 has Steady State Low (1 sec)	Transfers to supply 2 if on 1
S 1 /S2 /S3	HI / OK	Supply 1 or 2 OR 3 has Steady State High (1 sec)	Transfers to supply 2 if on 1
SUPPLY 1 or 2 or 3	FAILED / OK	Supply 1 or 2 OR 3 has Steady State High (1 sec)	Transfers to supply 2 if on 1
OVERRIDE	0,1, 2	Controls Override set to S1	User - Manual Switch Only
PREFERRED	0,1, 2	Preferred Source Set (0 or 1)	User - Manual Switch Only
S 1 / S2	FREQ LOW / HI /OK	Frequency of supply 2 is high or low	Alarm No action
LOCAL XFER	1, 2	Local Transfer to Supply 1 or 2 requested	User - Manual Action
REMOTE XFER	1, 2	Remote transfer to Supply 1 or 2 requested	Via User Inputs or BMS
BACK FEED	1 or 2 on (R, W, B)	Back feed voltage too high on S1 or S2	Contact Chloride
REMOTE POWER	OFF/ON	Remote Supply off Requested (EPO)	Via User Inputs or BMS
SYNCRONISATION	LOS / OK	S1 & S2 not in synchronism	Alarm No action

5. Fault Diagnosis

Event Descriptor	Append	Description	STS Action Resulting
CURRENT	WARN / HIGH /FAULT/OK	Output is overloaded (timed shutdown)	Alarm No action starts timer
HEAT SINK TEMP	HI /OK	Fans Failed or Over Stressed Device Temperatures, Heat Sink is Over temperature	No Action – Check & Reduce Loading or Ambient
LOAD FAULT	FLT/ CLR	There was a fault at the load	Does not transfer (Inhibit)
FAN	FAIL / OK	Status Indication Only	No Action - Repair
THDI	HI / OK	Total harmonic Distortion of current is very high	Alarm No Action – Check Load
THDV	HI / OK	Total harmonic Distortion of Voltage is too high	Alarm No action - Check Load
BREAKER OPEN	Q1, Q2, Q3, Q4 or Q5	Status Indication Only	Response to interlocking controls
BREAKER CLOSED	Q1, Q2, Q3, Q4 or Q5	Status Indication Only	Response to interlocking controls
TRIPPED	Q1, Q2, Q3, Q4 or Q5	Status Indication Only	Response to interlocking controls
ALARM CANCEL		Alarm Cancel was pressed	Resets Audible & Latched fault
POWER SUPPLY	1,2 or 3	Status Indication Only	None -Contact Chloride / Repair
SCR SC	S1,S2 R, W, B, N	SCR on S1 or S2 short circuit detected on phase #	Contact Chloride – Locks to safe source
SCR OC	S1,S2 R, W, B, N	SCR on S1 or S2 Open circuit detected on phase #	Contact Chloride – Locks to safe source

5. Fault Diagnosis

5.2 Load Fault

In case of sustained high current output load faults, the STS will inhibit a transfer to the alternate supply even if this means degradation or loss of source supply. It is therefore imperative that you ensure that the discrimination with downstream and upstream protective devices ensures that the downstream protective device always clears the fault first.

In case that all output is lost the faulty equipment should be located and removed from the STS output before re-instatement of power.

At this point it is recommended that the UPS source (1 or 2) be transferred to bypass to allow greater capacity to isolate downstream faults without affecting UPS output voltage integrity. It will be necessary to gain access to the STS internal maintenance bypass switch for 1 or 2. The supply from the UPS system in bypass mode should be selected by manual operation of the corresponding maintenance bypass switch.

Application of this power should clear any downstream faults still present. The alarm pushbutton in the CONTROL menu is then pressed for 10 seconds to reset the alarm conditions, followed by the transfer switch for the desired source to reinstate the STS to normal operation.

When the LCD mimic indicates that the STS is active again (the 1 and/ or 2 LCD bar is Green), the maintenance bypass isolator can be manually opened.

Do not use the OVERRIDE switch to affect a transfer.
It is for maintenance only. If the front panel controls are inoperative then the load can be safely transferred using the PRIORITY SWITCH to position 1 or 2 as desired.

6. Maintenance

6.1 Overview

The STS s has been manufactured to provide a long, reliable and useful life. However, all equipment needs some maintenance.

After the welcome sign you may be prompted to enter the date and time. This should be required the first time only. We strongly encourage the setting of the date and time so that real time event correlation can be undertaken. The Real Time Clock is thereafter battery backed up.

If the STS has been off for 2-3 months awaiting installation the battery requires replacement. We recommend that the battery be replaced every 3 years as a precautionary matter.

Recommended Schedule:
Once per month record the operating variables and compare with the units specifications to ensure that you are within its operating capability. Inspect the unit and note down any variations from last observation. Action may need to be taken and or reporting may need to be taken on these variances.

Inspect the Event History and correlate any recorded events since last observation with real occurrences. Report / investigate any suspicious entries.

Once every 6 months, (sooner if the environment is bad), vacuum dust from grills at front of unit. Inspect cable / plug connections for overheating.

Units with fans need their fans changed every 3-5 years. This may need to be sooner if the environment is bad.

NOTE:

Please note that the user should not undertake repair procedures or gains access to the internal of the equipment.
If the unit is faulty then it should be removed from service as per the accompanying procedure and a qualified experienced service agent should affect repair.

7. Specifications

7.1 Operating Parameters

Rating, 3-Phase / phase	63 Amperes RMS
Voltage Rating	400/230 V ± 20%
Permissible Voltage Distortion	15% THDV
Frequency	50 Hz ± 5%
Type	3 Phase 4 - pole
Efficiency	98.7%
Transfer Type	Thyristor (break-before-make, no source overlap, zero current)
Detection	Digital (< 1 msec)
Break time	Normal; (< ½ msec), Max < ¼ cycle (5msec).
MTBF	> 800,000 Hrs
Device Ratings	125 Amperes RMS, 1600 Volts, 2 kA 10msec, 20kA A^2S
Fault rating	20 kA (10 msec) Safe Operating Limit Only
dV/dt	1000 V/µsec
Minimum Current	0 Amperes
Fault Current Setting	250 Amperes peak (transfer lock-out)
Protection	Internal 100 Ampere Fuses
Overload Capacity	Up to 120 % for 30 seconds
	150 % for 0.5 second
	400 Amperes for 100 msec
	2000 Amperes for 10 msec
User Interface	Hierarchical, Colour, backlit, touch screen real-time monitoring (internal manual override controls)
Remote I/O	5 x Voltage free contacts (50 V DC, 1 Ampere N/C) + 2 Transfer Controls
LAN Browser	Standard
Modbus TCP	Standard
SNMP	Standard
Operating Temperature	0 - 45 °C
Cooling	Natural
Physical Size	460 mm wide x 220 mm deep and 550mm high
Environmental Rating	IP41
Weight	25 kg (typical)
Colour	Black Powder Coat / Black front panel (or as specified)
Compliance	IEC 62310-1,2 & 3 (for STSs), CE Approval
Inlet / Outlet Connections	Fixed Cassette terminals 35 mm2

8. Main Item Components

Part	Description	Manufacturer	Part Number	Rating
thy1 – 1 to 8	thyristors	Semikron	sk120kq16	120 Amps/ 1700 v
snb1, snb2	dv/dt limiter	sp	0.22/22	1000 v/usec
q1,q2	isolator	SP	INS100D	100 Amps
f1 & f2	fans	sunon	Er 60/25 12 v dc	12 V dc
F #	fuses & terminals	Dinkle	DK35N	125 Amperes 440 V
Fused Isolators	Disconnect Terminals (DIN35)	WAGO	280912	10 Amp
main power board	power control board	i-sts	SP049R0	n/a
main control card	sts control board	i-sts	SP034R2	63 a
colour lcd	display board	reach	51-0105-02	5 v dc
sp vt card	voltage feedback monitoring board	i-sts	SP033R3	n/a
sp firing card	scr gating board	i-sts	SP036R1	n/a
sp038r0	user i/o board	i-sts	SP038R0	n/a
bypass switch 100	maintenance bypass switch	ASN switchgear	WA 143/32e-13 with z32/d2	63 Amperes
main power fuse 125	Semiconductor Fuse	Bussmann	RG4s (100FE)	100 Amperes
prs1-3	power supply +hd	Meanwell	PD25A	+5 v / +12 25 w

9. Contact

9.1 Contact Details

For Service and Maintenance
The unit is warranted for 24 months from date of manufacture on a return to manufacturer basis.
Static power will repair or replace faulty items should the unit become defective during this period.
In the event that you wish Static Power Pty. Ltd. to come to site service charges and travelling expenses will result.

A component or STS may be returned to us for repair or replacement, however, the user bears all costs associated with transport of the goods to and from our works.

It should be noted that fuse failures and damages and returns as a result of incorrect upstream or downstream protection are not covered by warranty. We do not advise that the user replace the internal fuses. In case of fuse failure other components too could have sustained damage and any remedial action should be undertaken by a certified repair agent or the unit returned to the manufacturer for repair and re-test.

We will provide a 24/ 7 telephone support.

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Warranty is void if not installed as per the instructions and cautions as outlined in this manual or if operated outside of its specification or unauthorised access is gained.